

REMARKS

Claims 42-74 remain in the application.

Claims 63-74 are allowed. Claims 49-54 and 58-62 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 42-44, 46-48 and 55-56 stand rejected under 35 USC §103(a) as being unpatentable over Hamzehdoost in view of Tummala et al. Claims 45 and 57 stand rejected under 35 USC §102 as being anticipated by Hamzehdoost (U.S. Patent No. 5,999,415).

The drawings stand objected to for failing to comply with 37 CFR §1.84(p)(5) because they include the following reference signs not mentioned in the description: 58b and 58c. Applicant disagrees and requests reconsideration.

Regarding 58b, such reference number is shown in Fig. 9 wherein the originally-filed application states Fig. 9 is a third embodiment of the invention (pg. 13, lines 1-2). Moreover, the originally-filed application states that in referring to Fig. 9, similar numbering will be utilized as was used in describing Fig. 6, with the suffix "b" used to indicate structures shown in Fig. 9 (pg. 13, lines 12-4). Referring to the description of Fig. 6 in the originally-filed application, reference number 58 is clearly described at: page 7, lines 19-20; page 8, lines 8-17; page 10, lines 21-23; and page 11, lines 11-13. Accordingly, reference number 58b is understood to be the structure referenced as 58 for Fig. 6, except that the inclusion of "b" denotes the third embodiment of the invention illustrated by Fig.

9. Applicant submits that reference number 58b is mentioned in the description of the originally-filed application, and therefore, Fig. 9 complies with 37 CFR §1.84(p)(5). Applicant requests withdrawal of the objection in the next Office Action.

Regarding 58c, such reference number is shown in Fig. 10 wherein the originally-filed application states Fig. 10 is a fourth embodiment of the invention (pg. 14, lines 6-7). Moreover, the originally-filed application states that in referring to Fig. 10, similar numbering will be utilized as was used in describing Fig. 9, with the suffix "c" used to indicate structures pertaining to Fig. 10 (pg. 13, lines 12-4). Accordingly, reference number 58c is understood to be the structure referenced as 58b for Fig. 9 which is the structure referenced as 58 for Fig. 6, except that the inclusion of "c" denotes the fourth embodiment of the invention illustrated by Fig. 10. Applicant submits that reference number 58c is mentioned in the description of the originally-filed application, and therefore, Fig. 10 complies with 37 CFR §1.84(p)(5). Applicant requests withdrawal of the objection in the next Office Action.

Claim 42 stands rejected as being unpatentable over Hamzehdoost in view of Tummala et al. Applicant disagrees and requests reconsideration. Claim 42 recites providing an insulative substrate having circuitry thereon and an opening therethrough and adhering a semiconductive-material-comprising die to the substrate with an electrically conductive adhesive. Claim 42 further recites the die having circuitry supported thereby, and electrically connecting the circuitry supported by the die to the circuitry on the substrate with a plurality of electrical

interconnects extending through the opening. Claim 42 is at least allowable over the cited references for at least the reason that the references do not suggest or disclose the recited a plurality of electrical interconnects extending through the opening. The Examiner relies on Hamzehdoost to allege the teaching of such limitation (page 4 of paper no. 6) with Tummala relied upon to teach the use of an electrically conductive adhesive to adhere a die to substrates (pg. 4 of paper no. 6). However, Hamzehdoost teaches a flexible insulated tape layer 120 has a central opening through which an integrated circuit die 102 extends (col. 4, Ins. 60-62). A plurality of wire-bonding loops 136 extend from a bottom surface 116 of the die 102 to the insulated tape layer 120, and as shown in Fig. 3, the wire-bonding loops 136 extend over and above the central opening (col. 4, lines 53-55 and col. 5, lines 3-7). Accordingly, in no fair or reasonable interpretation does Hamzehdoost suggest or teach the plurality of electrical interconnects **extending through the opening** as recited in claim 42. Since Tummala fails to teach such limitation, the combination of Hamzehdoost and Tummala fails to teach a positively recited limitation of claim 42. For at least this reason, the obviousness rejection against claim 42 must fail and claim 42 is allowable. Applicant respectfully requests withdrawal of the obviousness rejection against claim 42 in the next Office Action.

Moreover, the combination of Hamzehdoost and Tummala is improper. The Examiner is respectfully reminded that MPEP §2143.01 states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the

references are not sufficient to render the claims *prima facie* obvious" MPEP §2143.01 citing to *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The Ratti court reversed an obviousness rejection holding that the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principles under which the [primary reference] construction was designed to operate" 270 F.2d at 813, 123 USPQ at 352. In the instant case, Tummala is relied upon to teach the use of an electrically conductive adhesive to adhere a die to substrates (Pg. 4 of Paper No. 6), and to combine such a teaching to modify the Hamzehdoost structure. To modify the Hamzehdoost structure with the teaching of Tummala as suggested by the Examiner, that is, to adhere the die 102 to the insulated tape layer 120 with an electrically conductive adhesive, would require a substantial reconstruction and redesign of the elements shown in Hamzehdoost as well as change the basic principles under which the Hamzehdoost construction was designed to operate contrary to the above authority.

For example, Hamzehdoost teaches the die 102 and insulated tape layer 120 are separately adhered to a flat surface 106 of a heat spreader 108 (col. 4, lines 45-65), and one skilled in the art understands that such configuration provides efficient heat dissipation for circuitry on the die 102 and insulated tape layer 120. If the Hamzehdoost invention was modified to have the die 102 adhered to the insulated tape layer 120 with an electrically conductive adhesive, how would the heat spreader 108 be configured to provide dissipation of heat

from both the die 102 **and** insulated tape layer 120. A substantial reconstruction and redesign of the Hamzehdoost construction would be required, and therefore, a change in the basic principle under which the Hamzehdoost construction was designed to operate would result, contrary to the above authority. What about the bonding-wire loops 136? Would such loops be needed if the die 102 is adhered to the insulated tape layer 120 with an electrically conductive adhesive? Whether the answer is yes or no, a substantial reconstruction and redesign of the Hamzehdoost construction would be required, and therefore, a change in the basic principle under which the Hamzehdoost construction was designed to operate would result, contrary to the above authority. Consequently, the combination of Hamzehdoost with Tummala is inappropriate because the modification of the Hamzehdoost construction would require a substantial reconstruction and redesign of the Hamzehdoost construction and a change would result in the basic principle under which the Hamzehdoost construction was designed to operate. For this additional reason, the obviousness rejection against claim 42 fails and claim 42 is allowable. Applicant respectfully requests allowance of claim 42 in the next Office Action.

Claims 43-44 depend from independent claim 42, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are neither shown or taught by the art of record.

Claim 45 recites providing an insulative substrate having circuitry thereon and an opening therethrough, and adhering a semiconductive-material-comprising

die to the substrate and electrically connecting circuitry supported by the die with the circuitry on the substrate utilizing a plurality of electrical interconnects extending through the opening. Claim 45 further recites joining a metal foil to the substrate, the metal foil having a segment extending over the die and in physical contact with at least a portion of the die.

As stated previously, Hamzehdoost fails to teach a plurality of electrical interconnects extending through the opening. Consequently, Hamzehdoost, singularly or in any combination, fails to teach a positively recited limitation of claim 45. The rejection fails for at least this reason and should be withdrawn. Claim 45 is allowable and Applicant respectfully requests allowance of claim 45 in the next Office Action.

Moreover, Hamzehdoost teaches die 102 is affixed to heat spreader 108 with a layer 110 of die-attached material (col. 4, Ins. 43-49). In no fair or reasonable interpretation of such a disclosure could Hamzehdoost teach or suggest the metal foil having a segment extending over the die and in **physical contact** with at least a portion of the die as recited in claim 45. Accordingly, Hamzehdoost fails to teach, singularly or in any combination, another positively recited limitation of claim 45. For this additional reason, claim 45 is allowable. Applicant respectfully requests allowance of claim 45 in the next Office Action.

Claims 46-56 depend from independent claim 45, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are neither shown or taught by the cited art.

Claim 57 recites providing an insulative substrate having circuitry thereon and an opening therethrough, adhering a semiconductive-material-comprising die to a metal foil, the die having circuitry supported thereby. Claim 57 further recites electrically connecting the circuitry supported by the die to the circuitry on the substrate with a plurality of electrical interconnects extending through the opening.

As stated previously, Hamzehdoost fails to teach a plurality of electrical interconnects extending through the opening. Consequently, Hamzehdoost, singularly or in any combination, fails to teach a positively recited limitation of claim 57. The rejection against claim 57 fails and should be withdrawn. For this reason, claim 57 is allowable and Applicant respectfully requests allowance of claim 57 in the next Office Action.


Claims 58-62 depend from independent claim 57, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are neither shown or taught by the art of record.

This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Appl. No. 09/756,971

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor Salman Akram
Assignee Micron Technology, Inc.
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Examiner Josetta I. Jones
Attorney's Docket No. MI22-1572
Title: Methods of Forming Board-On-Chip Packages

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO DECEMBER 5, 2001 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and
strikeouts indicate deletions.

There are no amendments to the claims.

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